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Text and graphical slides used by

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Assessing Ecological Health: Defining Terrestrial Indicators

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Methods

Study Sites

- 13 (‘97) and 17 (‘98) sites in Central Hanford
- Similar elevation, soil type, slope, aspect
- Disturbance ranged from minimal to that of different types, duration, or intensity
- Disturbances included fire, grazing, agriculture, and other physical impacts

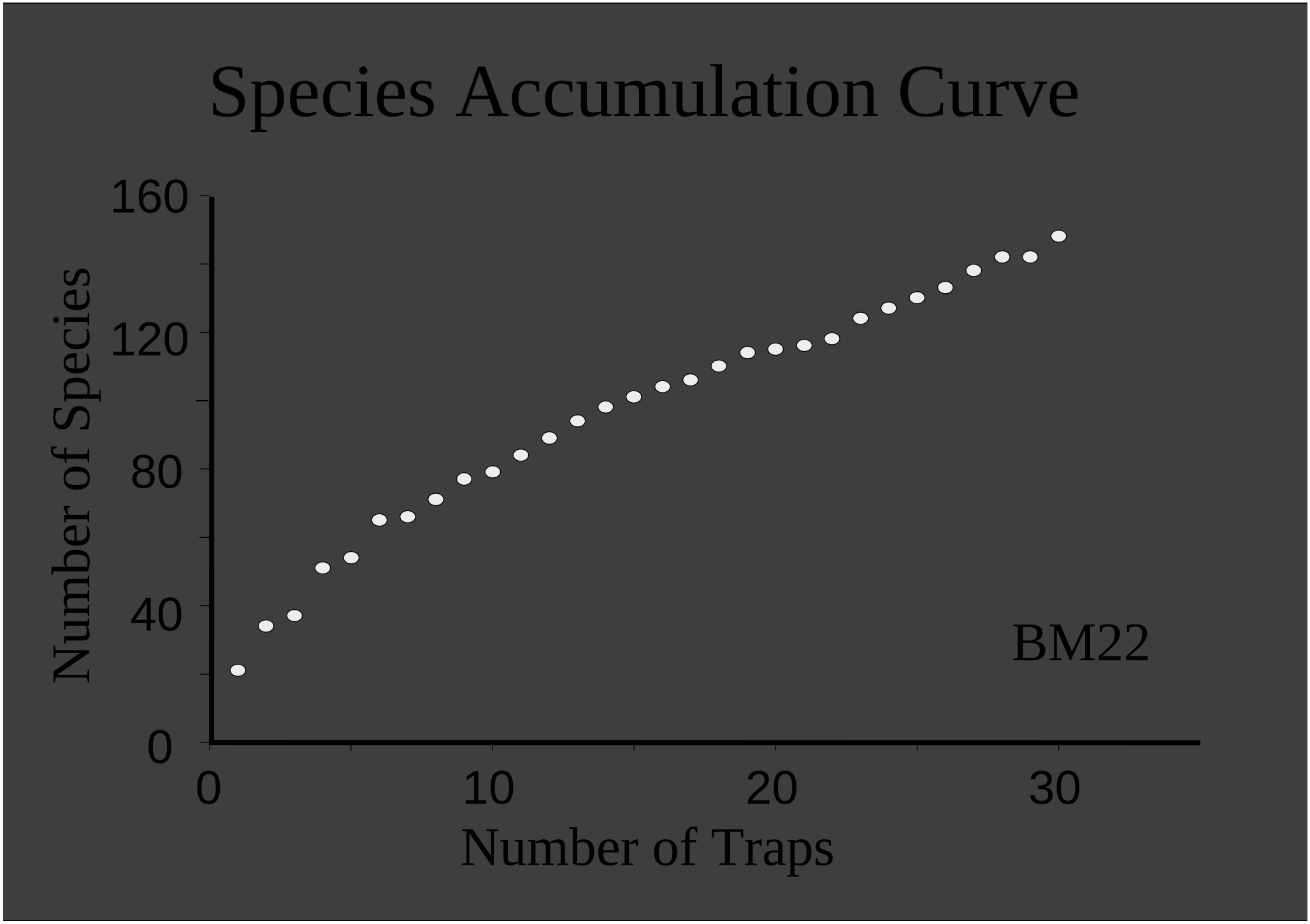
Sampling Methods: Plants

- **Grasses**: richness, cover
- **Forbs**: richness, cover, abundance
- **Shrubs**: richness, cover, density
- **Soil crusts**: cover by species and morphological groups

Three 100-m transects at each site

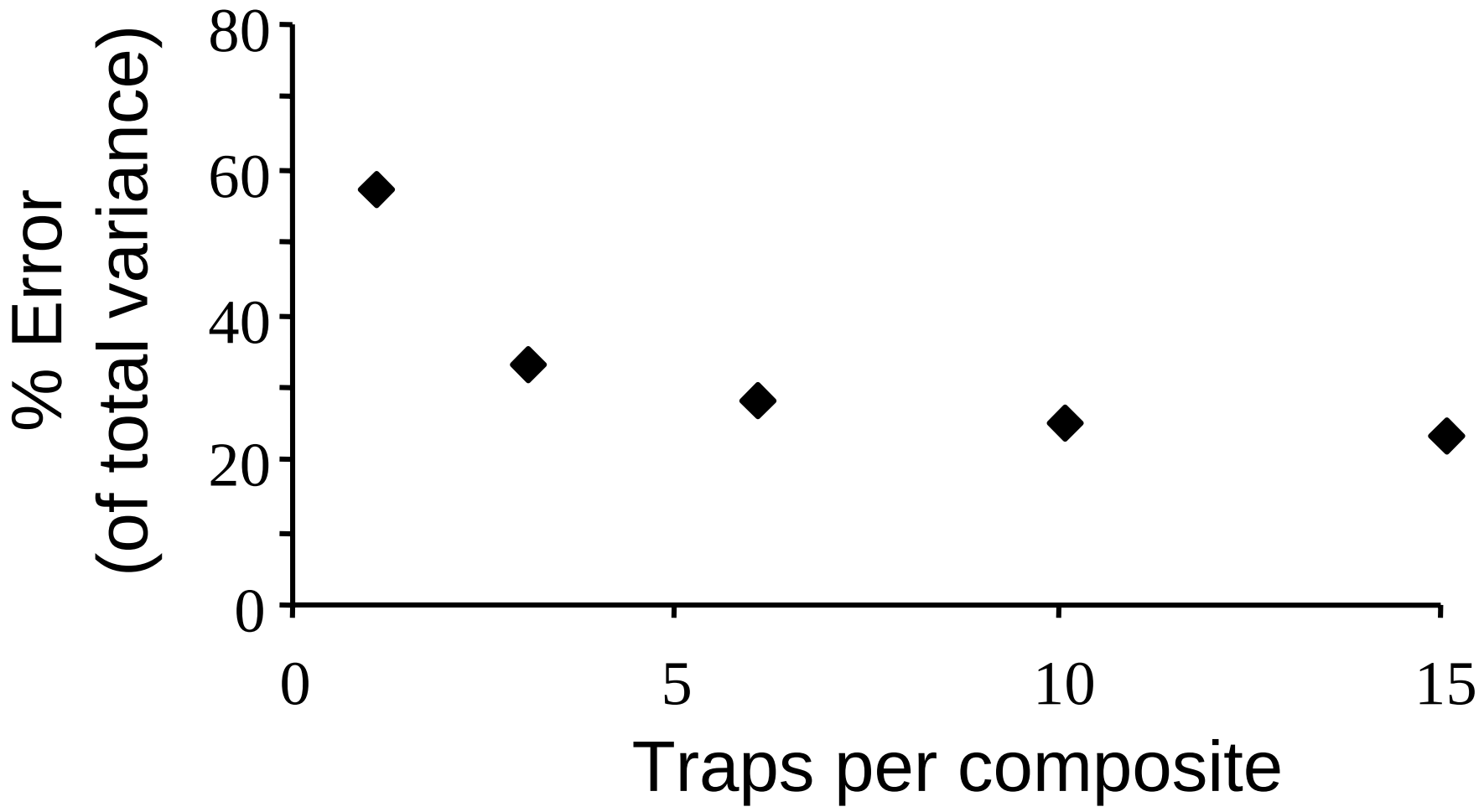
Sampling Methods: Insects

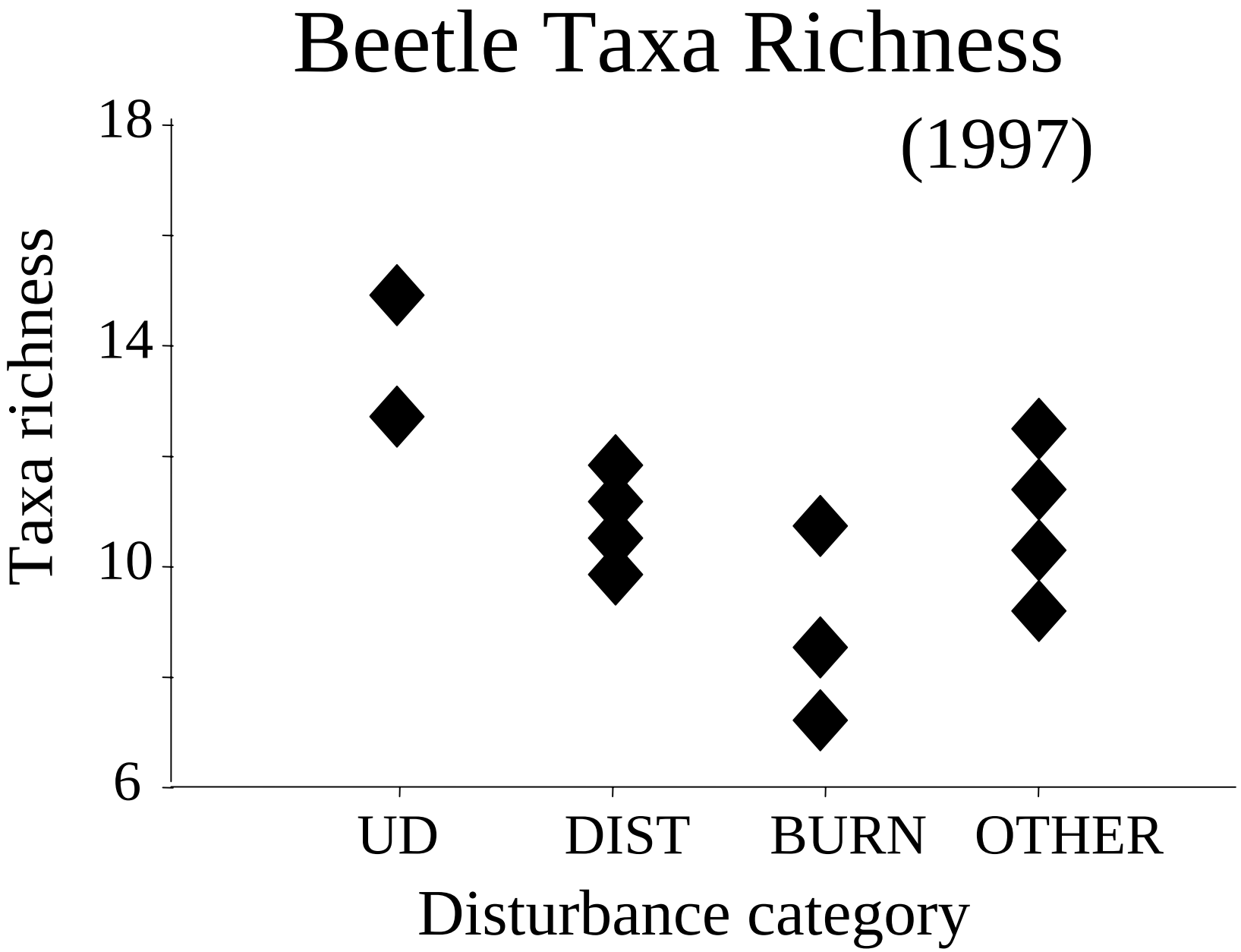
- **Pitfall traps**: 75 per site
- **Sweep-nets**: 120 sweeps per site
- **Butterfly transects**: visual surveys, 4 per site
- **Foliage Insects**: *Artemesia shrubs*, 10 per site


Species Accumulation Curve
160
120
80
40
0
Number of Species
0
10
20
30
Number of Traps
BM22

Measurement Error

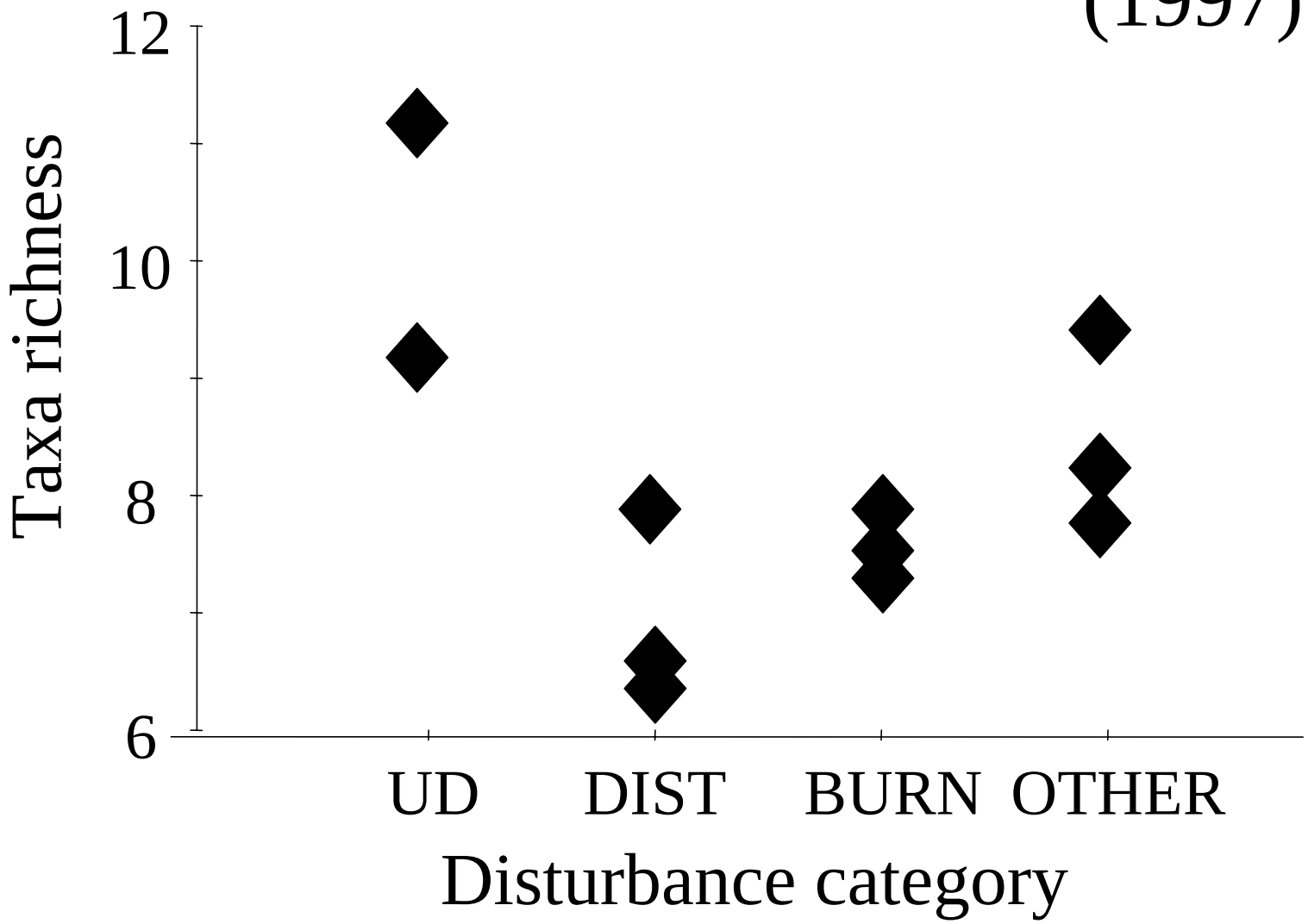
(declines as effort increases)




Beetle Taxa Richness
(1997)
Taxa richness
18
14
10
6
UD
DIST
BURN
OTHER
Disturbance category

Decomposer Taxa Richness

(1997)



General Trends

Low *Disturbance* *High*

Total Shrub Cover ↓

Density Alien Annuals ↑

Total Density of Forbs ↑

Relative Abundance of Native Forbs (%) ↓

Lichen Cover ↓

General Trends

Low *Disturbance* *High*

Family, Species Richness ↓

Tenebrionidae taxa richness ↓

Diptera family richness ↓

Parasitoid taxa richness ↓

Decomposer taxa richness ↓

Predator taxa richness↓

Dominance ↑

Key Terms

Attribute - measurable component of biological system

Metric - attribute with <u>empirical</u> change in value along gradient of human influence

Index - integrative expression of site condition across multiple metrics

Measures of Economic Health

- Index of leading economic indicators
- Cost of living index
- Consumer price index
- Dow-Jones industrial average

Key Components of IBI

- Assessment in numeric and narrative form
- Concept of reference condition
- Classification into homogeneous sets
- Assessment along gradient of human influence
- Detect more than chemical degradation
- Multimetric uses richness of biological signal
  - individual, population, assemblage

Multimetric Indexes Used to:

- Measure condition, thus detect degradation
- Diagnose causes of degradation
- Identify management actions to halt or reverse degradation
- Evaluate success of management
- Evaluate “mitigation” or “creation” programs
- Evaluate ecological risks from planned actions

Biological Monitoring:

Benchmark, Guide, and Goal